Questions for Duke Energy (6/24/2014)

Questions Regarding FGD Data Provided for Allen Steam Station

1. For the analytical data, non-detects are provided as "<value" (i.e., <0.01). Is the value provided the detection limit (MDL) or reporting limit (RL)? If not the RL, please provide that value.

   The value provided is the reporting limit.

2. On the "Analytical Methods" tab, what value is provided in Column C (see table below)? Is this the MDL or the RL? If not the RL, please provide that value for each method. Reporting limit. Please see correction to method for nitrate in table below.

From "Analytical Methods" tab in the "Allen EPA Data Final 3_28_14.xlsx" and "BC EPA Data Final 3_28_14.xlsx" files			
Analyte	Method	RL ~~??~~	Notes
As, Be, Ca, Cr, Cu, Ni, Ag, Zn, Se	200.8 (ICP-CRC-MS)	10 ppb	May vary with dilution
B,Fe	200.7		
Hg (results ≥ 1ppb)	245.1	1 ppb	May vary with dilution
Hg (results < 1 ppb)	1631E	1 ppt	May vary with dilution
Alkalinity	2320B		
Ammonia~~, Nitrate~~	350.1	0.04 ppm	May vary with dilution
Nitrate	353.1	0.01 mgN/L	May vary with dilution
Br, Cl	300.0	10 ppm	May vary with dilution
TKN	351.2	0.1 ppm	May vary with dilution
TDS	2540C	10 ppm	May vary with dilution
TSS	2540D	4 ppm	May vary with dilution
Se Speciation (Applied Speciation)	IC-ICP-DRC-MS	Variable	May vary with dilution

3. What is represented in the "RC" tab of the "Allen EPA Coal Data Final 3_38_24.xls" file?

   This spreadsheet provides the dates and amounts of refined coal operations. Refined coal operations are conducted to receive tax credits under Section 45 of the IRS Code. The solution is sprayed onto the coal as the coal is being transferred from the coal pile to the bunker.

   a. What does each column in the spreadsheet represent?

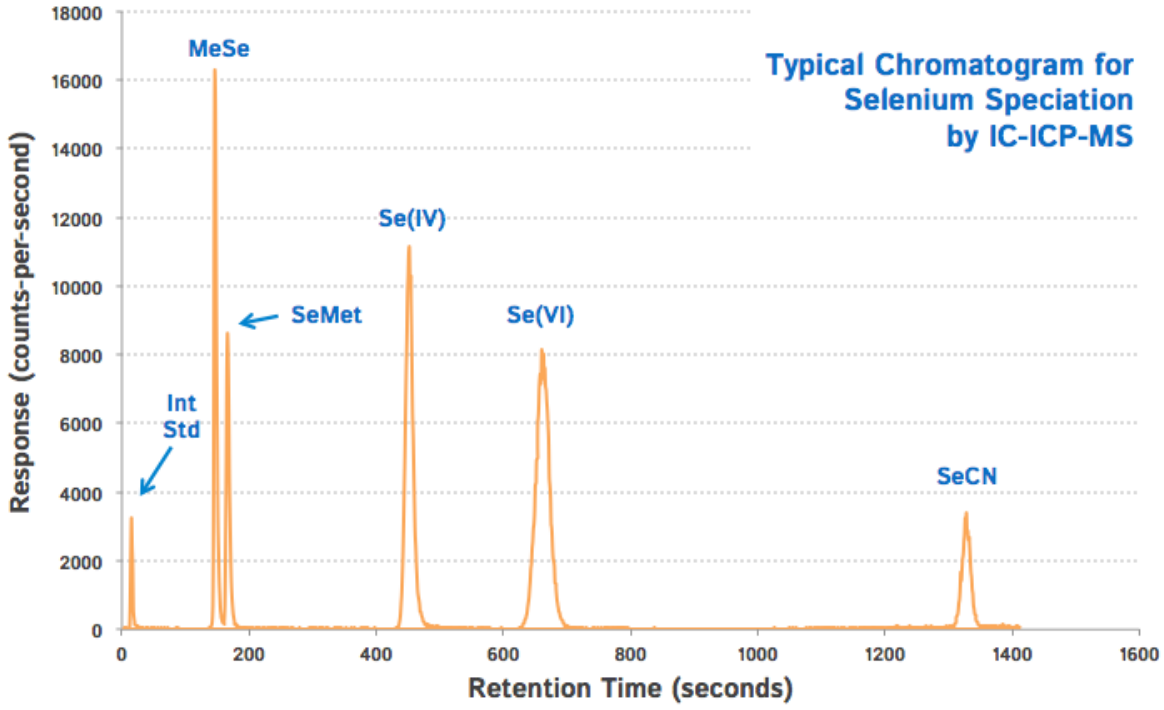
      - M-Sorb: calcium bromide solution (~52%)
      - M-Sorb Application Rate (lbm/ton): pounds of calcium bromide solution (mass basis) per ton of coal
      - M-Sorb Application Rate (%): ton of M-Sorb / ton of coal
      - S-Sorb: cement kiln dust
      - S-Sorb Application Rate (lbm/ton): pounds of cement kiln dust (mass basis) per ton of coal
      - S-Sorb Application Rate (%): ton of S-Sorb / ton of coal

   b. What process does this represent? This process represents refined coal operations. Does it have any effect on ash transport water or FGD wastewater characteristics? This could affect ash transport water and FGD wastewater characteristics both in terms of additional

chemicals added to the water as well as effects on ORP in the scrubber. Currently, the industry does not have a full understanding of the effects of these additives.

4. For the FGD Purge Eff on 10/5/2010, there is a beryllium result of 0 (zero). What does this "0" value represent? The "0" value presumably should be <0.05 mg/l; however, we are not able to locate the laboratory report at this time. This will need to be confirmed after reviewing the laboratory report.

5. In the "Analytical" tab, there is a field titled, "Se(UK) (ug/L)"
   a. What does this field represent? Total concentration of all unknown selenium species observed by the IC-ICP MS
   b. Were these values measured or calculated, and what does a value of 0 (zero) represent? Measured. A zero value means no unidentified peaks observed by the IC-ICP MS. This means all peaks were identified to a known species of selenium. See example below.



6. In the "Analytical" tab, the concentrations reported for the FGD Purge Eff on 10/9/2010 for MeSe(IV), SeCN, and SeMe are "<0". Is this correct? No What does this represent? This appears to be a data entry error. Selenium speciation analysis did not appear to be conducted for the samples collected on 10/9/2010.

7. Lab reports were provided for the Cliffside and Miami Fort analytical data, but not for Allen Steam Station. Please provide the laboratory reports for the Allen analytical data. Duke Energy is in the process of obtaining the laboratory reports.

8. Please confirm the data in column H are for the combined parameter nitrate-nitrite. What analytical method was used for these data (9/29/11-12/22/11, 6/3/13-10/22/13)?

   EPA Method 353.2

9. Both the Bio Influent and Bio Effluent nitrate-nitrite data for 12/20/11 are listed as 97 mg/L. What are the correct values for this day? This will need to be confirmed after reviewing the laboratory reports.

10. Effluent concentrations of nitrate-nitrite and selenium were elevated in December 2011. Effluent selenium was again elevated in December 2012 / January 2013. What caused these increases in effluent concentration? The 12/11 increase was a result of the elevated ORP event. A similar more controlled situation occurred in 12/12 – 01/13.

Questions Regarding FGD Data Provided for Belews Creek Steam Station

1. For the analytical data, non-detects are provided as "<value" (i.e., <0.01). Is the value provided the detection limit (MDL) or reporting limit (RL)? If not the RL, please provide that value.

   The value provided is the reporting limit.

2. On the "Analytical Methods" tab, what value is provided in Column C? (See the table above for the information provided on the "Analytical Methods" tab.) Is this the MDL or the RL? If not the RL, please provide that value for each method. RL

3. Please explain what is represented in the "COMBINED BELEWS CREEK" tab of the "BC EPA Coal Data Final 3_28_14.xlsx" file.

   This spreadsheet provides information on the addition of additives to mitigate / assist with de-slagging of the boiler. The additives are sprayed onto the coal as the coal is being transferred from the coal pile to the bunker.

   a. What does each row in the spreadsheet represent?

      - CT300 (ppm): pounds of magnesium hydroxide solution (~60 to 70%) per million pounds of coal
      - CT600 (ppm): pounds of calcium carbonate per million pounds of coal.

   b. What process does this represent and does it have any effect on ash transport water or FGD wastewater characteristics?

      This spreadsheet represents the deslagging mitigation process and potentially could affect ash transport water and FGD wastewater characteristics.

4. For the Bio 1 Inf on 4/26/2011, there is a dissolved selenium result of "<567". Is this a data entry error? The "<" should be deleted. The result for dissolved selenium was 567 ug/l. Also, the actual sample date was 4/27/2011.

5. In the "Analytical" tab, column AM is titled "Th, tot (mg/L)." Do the data in this column represent Thorium (chemical symbol Th), or do the data in this column represent Thallium (chemical symbol Tl)? Thallium

6. In the "Analytical" tab, the concentrations reported for the Bio 2 Eff on 11/28/2013 for Vanadium and Thorium/Thallium are "<0". Is this correct? What does this represent? These results appear to be <0.005 mg/L for both vanadium and thallium. We will need to confirm with the laboratory reports.

7. Lab reports were provided for the Cliffside and Miami Fort analytical data, but not for Belews Creek Steam Station. Please provide the laboratory reports for the Belews Creek analytical data. Duke Energy is in the process of obtaining the laboratory reports.

8. Please confirm the data in column I are for the combined parameter nitrate-nitrite. What analytical method was used for these data (5/15/13-11/28/13)? Method 353.2

Questions Regarding Information Provided for Cliffside Steam Station

1. Duke Energy provided the following spreadsheets that contain analytical data from the Cliffside pilot test:
    a. Cliffside Bio Pilot Test.xlsx (CBI);
    b. Cliffside EDD File.xlsx (CBI); and
    c. Non CBI Cliffside EPA data Final 3_14_14.xlsx

    Please confirm whether all the data contained in the "Cliffside Bio Pilot Test" and the "Non CBI Cliffside EPA data Final 3_14_14" file are also contained in the "Cliffside EDD File." The Cliffside EDD File begins with sample date 12/7/2011. The "Non CBI Cliffside EPA data Final 3_14_14" provides results for the FGD purge on 11/1/2011 and 12/5/2011 and the bioreactor influent on 12/5/2011. These data are not included in the EDD File.

2. The "Cliffside EDD File" contains additional information regarding the samples results that is not contained in the "Non CBI Cliffside EPA data Final 3_14_14" file, such as the MDL, RL, lab, and Flag. Is Duke Energy claiming this additional information as CBI for those sample results that are contained in the Non CBI Cliffside EPA data Final 3_14_14" file? No, we were not able to easily separate the EDD file. Duke is not claiming CBI on the FGD purge data or the bioreactor influent, including information on these results contained in the EDD File. If not, can EPA treat all the "bioreactor influent" data in the "Cliffside EDD File" as nonCBI? Yes

3. In the "Cliffside Bio Pilot Test" and "Non CBI Cliffside EPA data Final 3_14_14" files, there are certain analytical results that are highlighted green or yellow. Please explain what those colors represent. Results were less than the reporting limit

4. For the selenium speciation data submitted for the various sampling points, there is a field titled, "Unknown Se." Were these values measured or calculated, and what does a value of 0 (zero) represent? A zero value means no unidentified peaks observed by the IC-ICP MS. This means all peaks were identified to a known species of selenium. See response to #5 under Questions Regarding FGD Data Provided for Allen Steam Station.

Questions Regarding Bottom Ash Information Provided

1. For data provided in lab reports for Miami Fort (MFS U6 2012 Bottom Ash Test Lab Reports.pdf), please identify the unlabeled column presented after the Reporting Limit (RL) column. Method detection level

2. For Miami Fort, please provide the laboratory reports corresponding to the samples collected on 02/27/2014, as shown in the file named "MFS U8 2012 Bottom Ash Data Duke 2_27_14.xls"

    The samples dates for the bottom ash sluice water were 8-1-2012, 8-8-2012 and 8-9-2012. We are classifying the reports as CBI and will be submitted under separate cover.

3. For the Cliffside plant, please confirm the sample numbers located in the spreadsheet titled "Cliffside EDD 6_28_13.xlsx". Page 2 of the file titled "Cliffside Bottom Ash Lab Report 6_28_13.pdf" indicates 4 different sample numbers while only 1 sample number is presented in the spreadsheet.

   The LIMS did not carry over the sample ID correctly. Please find enclosed the revised EDD correcting this problem.

4. For Belews Creek please indicate the sampling events represented by the data presented in Appendix B of your comments on the proposed rule, submitted 9/19/2013. The data appears to represent the data from the 9/13/12 sampling event (Bottom Ash Belews Creek 9_13_12 Lab Report.pdf) and does not include any data from the 6/27/13 sampling event (Bottom Ash Belews Creek Report 6_27_13 Lab Report.pdf). Analytical results from both sampling events were used to produce the table for Belews Creek in Appendix B. If a parameter was analyzed for both sampling events, the average was reported in the table in Appendix B. Averaging was conducted for aluminum and manganese. All other parameters were either analyzed on the sample collected on 9-13-2012 or the sample collected on 6-27-13.

5. Please answer the following questions related to the bottom ash sampling results provided for East Bend, Cliffside, and Miami Fort:

   a. Please provide the Pond/Impoundment Unit ID (e.g., SPD-2) for the pond which bottom ash transport water sampled would enter. What is the residence time associated with this pond.

Refer to the ICR Questionnaire, Question D4-2 (as of 2009)

Station	Pond Impoundment Unit ID	Surface Area (ft^2)	Depth (ft)	Residence Time (hrs)
East Bend	SPD-1 / Pond 1	2,317,392	36.5	2,965
Miami Fort	SPD-1 / Pond-1	1,398,276	35	532
Cliffside	SPD-2	3,659,400	60	96

   b. Please provide a detailed description of the sampling method used to collect the samples. Specify the location of the bottom ash transport water sample provided (e.g., directly from bottom ash sluice pipe discharges into commingled pond or upstream prior to this point), and whether the sample was a grab or composite sample. Additionally provide duration and frequency information for all composite sampling (e.g., 24-hour composite collected every hour).

Plant	Operations
East Bend	The samples were collected in accordance with Method 1669. All samples collected were grab samples while bottom ash was being sluiced. The samples were collected directly from the bottom ash sluice water pipe prior to comingling with other wastewater sources. Pyrites and bottom ash are sluiced together.
Miami Fort	The samples were collected in accordance with Method 1669. All samples collected were grab samples while bottom ash was being sluiced. The samples

	were collected directly from the bottom ash sluice water pipe prior to comingling with other wastewater sources. Pyrites and bottom ash are sluiced together.
Cliffside	Refer to the document titled "UWAG Bottom Ash Sampling Protocol". Both samples were composite samples collected from the discharge pipe prior to comingling with other waste streams.

c. If the sampling protocol described in response to 5.b includes collecting the sample prior to the pond and allowing the sample to settle prior to collecting the resultant supernatant, please specify how long the bottom ash was in contact with the water prior to collecting the supernatant. Please explain whether this sample is meant to represent the ash pond effluent and, if so, explain how the amount of time the sample was allowed to settle compares to the residence time of the pond and why that is appropriate for representing the ash pond effluent.

Not applicable to samples collected at East Bend or Miami Fort.

Cliffside: The water was in contact with the bottom ash approximately5 hours prior to collecting the supernatant. The bottom ash sample was collected in the field in the carboy and transported back to the laboratory to collect the supernatant.

d. How often is the bottom ash sluiced at the plant? Please indicate whether samples were collected during periods when the bottom ash is not sluiced (i.e., source water is flowing through the pipe).

All samples were collected while bottom ash sluice water was being discharged.

Refer to the ICR Questionnaire, Question C3-3 (based on 2009 operations)

Plant	Unit	Average Sluice Water Flow Rate (gpd)	Typical Duration (hpd)	Typical Frequency (dpy)
East Bend	2	300,000	24	257
Miami Fort	6 (SE Unit 1)	302,250	4	365
Miami Fort	8 (SE Unit 3)	367,000	4	365
Cliffside	5	1,152,000	8	10

e. Please provide the associated TSS concentration for the source water and the bottom ash samples.

Plant	TSS Concentration
East Bend	Cooling tower blowdown is used for bottom ash conveyance and was not analyzed for TSS. At the plant intake, which supplies the cooling tower, NPDES-reported TSS value for the month (Aug. 2011) was 8 mg/l.
Miami Fort	For Unit 8, cooling tower blowdown is used for conveying the bottom ash. TSS for both cooling tower blowdown and bottom ash was provided on the submitted spreadsheet (see column "O").

	For Unit 6, service water is used and was not analyzed for TSS. TSS for bottom ash was provided in the submitted spreadsheet (see column "Q").
Cliffside	Source water was not analyzed for TSS.

f. Please describe any atypical operations occurring at the plant at the time of sampling (e.g., test burn of new coal).

Plant	Operations
East Bend	Normal operation
Miami Fort	Unit 8 sampling was conducted during refined coal operations. Date 8-1-12: baseline (prior to refined coal operations) Date 8-8 and 8-9-2012: during refined coal operations
Cliffside	Normal operation

General Clarification

1. The coal data for plants Allen, Belews Creek, Cliffside, Mayo, and Roxboro contain a field referred to as "Daily Reclaim." What does the "Daily Reclaim" represent and how does that compare to the data presented in the other columns?

   Coal samples for the sulfur content/SO2 analysis, etc are collected from the daily reclaim. The daily reclaim is the coal that is being transferred from the coal pile to the bunker to fuel the boiler. The other columns present the mine name, location and analysis of the coal being shipped and received. The percent blend is an estimate of the types of coal being burned that day.